

In the Claims:

1. (currently amended) Thermosensitive polymers containing at least one of magnetic and/or or metallic colloids, ~~characterized in that they~~ wherein said polymers are ~~can be~~ produced by inverse suspension polymerization and ~~that they~~ have a physical structure ~~which can be changed~~ changeable by magnetic induction.
2. (currently amended) ~~Thermosensitive~~ The thermosensitive polymers ~~containing magnetic and/or metallic colloids in accordance with~~ according to Claim 1, ~~characterized in that~~ wherein the polymers ~~consist of~~ comprise at least one compound selected from the group consisting of poly-N-isopropylacrylamide, poly-N-substituted acrylamides, poly-N-substituted methacrylamides, and copolymers of monomers from the group ~~comprising~~ consisting of N-isopropylacrylamide, N-substituted acrylamides and N-substituted methacrylamides, ~~or mixtures of the aforementioned polymers or/and copolymers.~~
3. (currently amended) ~~Thermosensitive~~ The thermosensitive polymers ~~containing magnetic and/or metallic colloids in accordance with~~ according to Claim 2, ~~characterized in that~~ wherein the polymers contain ~~one or more copolymers~~ at least one copolymer or block ~~copolymers~~ copolymer which ~~apart from the monomer(s) mentioned~~ contain ~~one or more comonomers preferably~~ at least one comonomer selected from the group of monomers containing carboxyl groups, ~~such as~~ consisting of acrylic acid[[,]] and methacrylic acid, or from the group consisting of acrylates, acrylate derivatives, methacrylates, methacrylate derivatives, acrolein, acrylamide, N-substituted acrylamides and vinyl acetate.
4. (currently amended) ~~Thermosensitive~~ The thermosensitive polymers ~~containing magnetic and/or metallic colloids in accordance with~~ Claim 2 or 3 according to claim 2, ~~wherein~~ characterized in that the polymers contain at least one or more copolymers copolymer or block ~~copolymers~~ copolymer selected from the group ~~comprising~~ consisting of polyacrylic acid, polyacrolein, polymethacrylic acid, polyacrylamide[[,]] and N-substituted polyacrylamides ~~and mixtures of the same.~~
5. (currently amended) ~~Thermosensitive~~ The thermosensitive polymers ~~containing magnetic and/or metallic colloids in accordance with one of Claims 1 to 4,~~ ~~characterized in that~~ according to claim 1, wherein the polymers are selected from the group consisting of nano-particles [[or]] and microparticles.
6. (currently amended) ~~Thermosensitive~~ The thermosensitive polymers ~~containing magnetic and/or metallic colloids in accordance with~~ according to Claim 1,

~~characterized in that wherein said [[the]] magnetic induction consists of~~ is a high-frequency, magnetic alternating field.

7. (currently amended) ~~Thermosensitive The thermosensitive polymers containing magnetic and/or metallic colloids in accordance with~~ according to Claim 1,  
~~characterized in that wherein the change in the physical structure consists of~~ is a change to the geometric form of the polymers.

8. (currently amended) ~~Thermosensitive The thermosensitive polymers containing magnetic and/or metallic colloids in accordance with~~ according to Claim 7,  
~~characterized in that wherein the change in the geometric form consists of~~ is a return to the original form displayed by the polymers before a change in form caused by heat ("shape-memory-polymer").

9. (currently amended) ~~Thermosensitive The thermosensitive polymers containing magnetic and/or metallic colloids in accordance with~~ according to Claim 1,  
~~characterized in that wherein the change in the physical structure consists of~~ is an enlargement or reduction in the size of the polymer particles.

10. (currently amended) ~~Thermosensitive The thermosensitive polymers containing magnetic and/or metallic colloids in accordance with one of Claims 1 to 9,~~  
~~characterized in that~~ according to claim 1, wherein the magnetic colloids comprise a material consist selected from the group consisting of ferromagnetic particles,  
superparamagnetic particles, ferrimagnetic particles, low-temperature-ferrites [[or]]  
and a ferrofluid with a particle size of <1  $\mu\text{m}$ .

11. (currently amended) ~~Thermosensitive The thermosensitive polymers containing magnetic and/or metallic colloids in accordance with~~ according to Claim 10,  
~~characterized in that wherein the low-temperature-ferrites have a Curie temperature in the range of~~ 30°C to 100°C.

12. (currently amended) ~~Thermosensitive The thermosensitive polymers containing magnetic and/or metallic colloids in accordance with one of Claims 1 to 11,~~  
~~characterized in that~~ according to claim 1, wherein the metallic colloids consist of elements comprise an element selected from the [[groups]] group consisting of 8, 9, 10  
[[or]] and 11 (group-classification: new-suggestion of the 1986 IUPAC definition  
[[1986]]).

13. (currently amended) ~~Thermosensitive The thermosensitive polymers containing magnetic and/or metallic colloids in accordance with one of Claims 1 to 12,~~  
~~characterized in that~~ according to claim 1, wherein a core polymer encapsulates the

magnetic and/or or metallic colloids are present in the form of a core polymer that surrounds them.

14. (currently amended) ~~Thermosensitive~~ The thermosensitive polymers containing magnetic and/or metallic colloids in accordance with according to Claim 13, characterized in that wherein the core polymer has a particle size of 50 to 1000 nm.

15. (currently amended) ~~Thermosensitive~~ The thermosensitive polymers containing magnetic and/or metallic colloids in accordance with Claim 13 or 14, characterized in that according to claim 14, wherein said magnetic and/or or metallic colloids encapsulated in the core polymer are present in a disperse colloid form.

16. (currently amended) ~~Thermosensitive~~ The thermosensitive polymers in accordance with one of Claims 13 to 15, characterized in that according to claim 13, wherein the encapsulating core polymer is selected from the group consisting of chitosan, dextran, starch, polyacrylic acid, polysaccharides, silica gel, silicone derivatives, cellulose, proteins, albumin, polyacrylic acids, agarose, alginate, polystyrene, polyacrylates, polymethacrylates, polycyanoacrylates, polymethyl methacrylate, polyvinyl alcohol, polyamides, polyesters, polyamino acids, hyaluronic acid, polylactides, polyglycolides, polyacrolein and copolymers of the same.

17. (currently amended) ~~Thermosensitive~~ The thermosensitive polymers containing magnetic and/or metallic colloids in accordance with one of Claims 1 to 16, characterized in that according to claim 1, wherein the polymers contain a porogen in an amount of 0.1-30 % by weight of a porogen.

18. (currently amended) ~~Thermosensitive~~ The thermosensitive polymers containing magnetic and/or metallic colloids in accordance with according to Claim 17, characterized in that wherein the porogen is selected from the group consisting of silica gels, proteins, nucleic acids, polyethylene glycols, polyethylene oxides and polysaccharides.

19. (currently amended) ~~Thermosensitive~~ The thermosensitive polymers containing magnetic and/or metallic colloids in accordance with one of Claims 1 to 18, characterized in that according to claim 1, wherein the polymers are cross-linked with a bi- or tri-functional cross-linking agent.

20. (currently amended) ~~Thermosensitive~~ The thermosensitive polymers containing magnetic and/or metallic colloids in accordance with according to Claim 19, characterized in that wherein the cross-linking agent has a concentration of 0.1% to 10% relative to the overall monomer content.

21. (currently amended) ~~Thermosensitive~~ The thermosensitive polymers ~~containing magnetic and/or metallic colloids in accordance with one of Claims 1 to 20,~~ characterized in that according to claim 1, wherein the polymers ~~[[have]]~~ further contain reactive groups that bond biomolecules.

22. (currently amended) ~~Thermosensitive~~ The thermosensitive polymers ~~containing magnetic and/or metallic colloids in accordance with~~ according to Claim 21, characterized in that wherein the bonding groups are reacted with a compound selected from the group consisting of affinity ligands, peptides, proteins, antibodies, antigens, enzymes, cell receptor antibodies, antibodies against tumor markers, antibody fragments, artificially produced antibodies, modified antibodies, antibody conjugates, oligosaccharides, glycoproteins, lectins, nucleic acids, streptavidin ~~[[or]]~~ and biotin.

23. (currently amended) ~~Thermosensitive~~ The thermosensitive polymers ~~containing magnetic and/or metallic colloids in accordance with one of Claims 1 to 22,~~ characterized in that according to claim 1, wherein the polymers further contain at least one encapsulated active agent ~~which can be released~~ releasable from the polymer into the environment by exposure to a magnetic field.

24. (currently amended) ~~Thermosensitive~~ The thermosensitive polymers ~~containing magnetic and/or metallic colloids in accordance with~~ according to Claim 23, characterized in that wherein the at least one encapsulated active agent is ~~agents are~~ selected from the group consisting of hormones, cytostatic agents, antibodies, antibody derivatives, antibody fragments, cytokines, immunomodulators, antigens, proteins, peptides, lectins, glycoproteins, nucleic acids, antisense-nucleic acids, oligosaccharides, antibiotics ~~[[or]]~~ and generic agents.

25. (currently amended) ~~Process~~ A process for the production of thermosensitive polymers in accordance with claim 1, comprising the steps of one of Claims 1 to 24, characterized in that ~~an aqueous monomer solution in which the magnetic and/or metallic colloids are dispersed is suspended~~ dispersing at least one of magnetic or metallic colloids in an aqueous monomer solution;

suspending said aqueous monomer solution through mechanical comminution in an organic phase that is not miscible with water after adding a multifunctional cross-linking agent and a radical initiator and;

~~[[is]]~~ radically polymerizing said organic phase ~~polymerized~~ to nano- or microparticles.

26. (currently amended) ~~Process~~ A process for the production of thermosensitive polymers in accordance with claim 1, comprising the steps of one of Claims 1 to 24, ~~characterized in that an aqueous monomer solution in which the magnetic and/or metallic colloids are dispersed~~ dispersing at least one of magnetic or metallic colloids in an aqueous monomer solution;

~~suspending said aqueous monomer solution is suspended~~ through mechanical comminution in an organic phase that is not miscible with water after adding a multifunctional cross-linking agent; and

~~[[is]] adding a radical initiator to radically polymerize said organic phase polymerized to nano or microparticles during the suspension process through the addition of a radical initiator.~~

27. (currently amended) ~~Process~~ The process for the production of thermosensitive polymers ~~in accordance with according to Claim 25 or 26, characterized in that ,~~ wherein said aqueous monomer solution comprises at least one monomer selected from the group consisting of N-isopropylacrylamide, N-substituted acrylamides, and N-substituted methacrylamides or mixtures of the same are used as a monomer.

28. (currently amended) ~~Process~~ The process for the production of thermosensitive polymers ~~in accordance with one of the Claims 25 to 27, characterized in that~~ according to claim 25, and further comprising the step of adding 0.05 to 30 % by mol co-monomers are added to the monomer solution.

29. (currently amended) ~~Process~~ The process for the production of thermosensitive polymers ~~in accordance with according to Claim 28, characterized in that wherein the~~ co-monomers are at least one compound selected from the group consisting of acrylate derivatives, methacrylate derivatives, acrylic acid, acrolein, methacrylic acid, acrylamide, and vinyl acetate or mixtures of the same.

30. (currently amended) ~~Process~~ The process for the production of thermosensitive polymers ~~in accordance with one of the Claims 25 to 29, characterized in that~~ according to claim 25, and further comprising the step of adding a material selected from the group consisting of ferromagnetic, superparamagnetic or ferrimagnetic substances, [[or]] low-temperature ferrites [[or]] and ferrofluids with a particle size of <1 µm are added to the monomer solution.

31. (currently amended) ~~Process~~ The process for the production of thermosensitive polymers ~~in accordance with one of the Claims 25 to 30, characterized in that~~ according to claim 30, wherein the ferromagnetic, superparamagnetic or ferrimagnetic

substances or low-temperature ferrites are present as colloids or in a powder form.

32. (currently amended) ~~Process~~ The process for the production of thermosensitive polymers ~~in accordance with Claim 25 or 26, characterized in that a nano or microparticle core polymer in which the magnetic and/or metallic colloids are dispersively encapsulated is added to the monomer solution according to claim 25, and further comprising the steps of:~~

dispersively encapsulating said at least one magnetic or metallic colloids in a nano or microparticle core polymer; and

adding said encapsulation to the monomer solution.

33. (currently amended) ~~Process~~ The process for the production of thermosensitive polymers ~~in accordance with~~ according to Claim 32, ~~characterized in that wherein the core polymer comprises a compound selected from the group consisting of is formed by chitosan, dextran, starch, polyacrylic acid, polysaccharides, silica gel, silicone derivatives, cellulose, proteins, albumin, polyacrylic acid, agarose, alginate, polystyrene, polyacrylates, polymethacrylates, polycyanoacrylates, polymethyl methacrylate, polyvinyl alcohol, polyamino acids, hyaluronic acid, polylactides, polyglycolides, polyacrolein [[or]] and copolymers of the same.~~

34. (currently amended) ~~Process~~ The process for the production of thermosensitive polymers ~~in accordance with Claims 25 or 26, characterized in that according to claim 25, wherein solvents are used as the organic phase and have a polar solubility parameter of 5-10 (cal/cm<sup>3</sup>)<sup>1/2</sup>.~~

35. (currently amended) ~~Process~~ The process for the production of thermosensitive polymers ~~in accordance with one of the Claims 25 or 26, characterized in that according to claim 25, and further comprising the step of adding at least one surfactive substance to the organic phase at 0.05 to 15 % by weight of one or more surfactive substances is added to the organic phase.~~

36. (currently amended) ~~Process~~ The process for the production of thermosensitive polymers ~~in accordance with~~ according to Claim 35, ~~characterized in that wherein the surface active substance is at least one compound selected from the group consisting of alkyl sulphosuccinates, polyoxyethylene aryl ethers, polyoxyethylenes, polyoxyethylene sorbitan esters, polyoxyethylene adducts, polyethylene propylene oxide block copolymers, alkylphenoxy polyethoxy ethanols, fatty alcohol polyethylene glycol ethers, polyglycerol esters, polyoxyethylene alcohols, polyoxyethylene sorbitan fatty acid esters, and polyoxyethylene acids and mixtures of~~

the same.

37. (currently amended) ~~Process~~ The process for the production of thermosensitive polymers ~~in accordance with~~ according to Claim 25, ~~characterized in that and further comprising the step of pre-polymerizing the monomer solution for 5-120 seconds before dispersion in the organic phase the monomer solution is pre-polymerized before dispersion in the organic phase for 5-120 seconds.~~

38. (currently amended) ~~Process~~ The process for the production of thermosensitive polymers ~~in accordance with one of the Claims 25 to 37, characterized in that~~ according to claim 25, and further comprising the step of bonding a compound selected from the group consisting of affinity ligands, peptides, proteins, antibodies, antigens, enzymes, cell receptor antibodies, antibodies against tumor markers, antibodies against tumor antigens, antibody fragments, artificially produced antibodies, modified antibodies, antibody conjugates, oligosaccharides, glycoproteins, lectins, nucleic acid, streptavidin ~~[[or]] and biotin are bonded to the polymers.~~

39. (currently amended) ~~Process~~ The process for the production of thermosensitive polymers ~~in accordance with one of the Claims 25 to 38, characterized in that active agents are encapsulated~~ according to claim 25, and further comprising the step of encapsulating the active agents in the polymers, ~~preferably by adding the active agent(s) to a monomer solution containing at least one of magnetic and/or or metallic colloids.~~

40. (currently amended) ~~Process~~ The process for the production of thermosensitive polymers ~~in accordance with~~ according to Claim 39, ~~characterized in that wherein the active agents are selected from the group consisting of~~ hormones, cytostatic agents, antibodies, cytokines, immunomodulators, antigens, proteins, peptides, lectins, glycoproteins, nucleic acids, antisense-nucleic acids, oligosaccharides, antibiotics and generic agents.

41. (currently amended) ~~Process~~ The process for the production of thermosensitive polymers ~~in accordance with one of the Claims 39 or 40, characterized in that~~ according to claim 40, and further comprising the step of adding a compound selected from the group consisting of 0.1 to 20 % by weight of polyvalent alcohols, polyvinyl alcohols, gelatins ~~[[or]] and carbohydrates are added to the active agents in an amount of 0.1 to 20% by weight.~~

42. (currently amended) ~~Process~~ The process for the production of thermosensitive polymers ~~in accordance with~~ according to Claim 41, ~~characterized in that wherein the~~

polyvalent alcohols or carbohydrates are selected from the group consisting of inosite, mannite, sorbite, aldonite, erythrite, sucrose, glycerine, xylite, fructose, glucose, galactose and maltose.

43. (currently amended) ~~Process~~ A process for the release of active agents from active agent-containing particles, ~~characterized in that wherein the~~ particles of thermosensitive polymers according to ~~one of Claims 1 to 24~~ claim 1 or particles which have been produced ~~in accordance with~~ according to a process ~~according to one of claim 25~~ Claims 25 to 44 are introduced comprising the step of introducing said particles into a magnetic alternating field, ~~preferably a high-frequency magnetic alternating field,~~ for the purpose of magnetic induction.

44. (currently amended) ~~Process~~ A process for changing the physical structure of thermosensitive polymers containing at least one of magnetic ~~and/or or~~ metallic colloids, or for warming or heating ~~[[such]]~~ said polymers, ~~characterized in that comprising the step of introducing~~ said polymers ~~are introduced~~ into a magnetic alternating field, ~~preferably a high-frequency magnetic alternating field,~~ for the purpose of magnetic induction.

45. (currently amended) The use of thermosensitive polymers containing at least one of magnetic ~~and/or or~~ metallic colloids ~~in accordance with one of the Claims 1 to 24~~ according to claim 1 or of particles produced ~~in accordance with~~ by a process according to ~~one of Claims 25 to 44~~ claim 25 as a contrast-intensifying media in NMR diagnostics, as carriers for active agents in medical therapy and diagnostics, as controllable carriers for reactants, as media to control microfluid processes, as separation media in column chromatography, as media to adjust and regulate pore sizes in membranes, as media to block blood vessels, as artificial cell carriers, as separation media for nucleic acids, cells, proteins, steroids, viruses or bacteria, in each case by using a magnetic alternating field, preferably a high-frequency magnetic alternating field.

46. (new) The process according to claim 43, wherein said magnetic alternating field is a high-frequency magnetic alternating field.

47. (new) The process according to claim 44, wherein said magnetic alternating field is a high-frequency magnetic alternating field.

48. (new) The process for the production of thermosensitive polymers according to Claim 26, wherein said aqueous monomer solution comprises at least one monomer selected from the group consisting of N-isopropylacrylamide, N-substituted



acrylamides, and N-substituted methacrylamides.

49. (new) The process for the production of thermosensitive polymers according to claim 26, and further comprising the step of adding 0.05 to 30 % by mol co-monomers to the monomer solution.

50. (new) The process for the production of thermosensitive polymers according to Claim 49, wherein the co-monomers are at least one compound selected from the group consisting of acrylate derivatives, methacrylate derivatives, acrylic acid, acrolein, methacrylic acid, acrylamide, and vinyl acetate.

51. (new) The process for the production of thermosensitive polymers according to claim 26, and further comprising the step of adding a material selected from the group consisting of ferromagnetic, superparamagnetic or ferrimagnetic substances, low-temperature ferrites and ferrofluids with a particle size of  $<1\ \mu\text{m}$  to the monomer solution.

52. (new) The process for the production of thermosensitive polymers according to claim 51, wherein the ferromagnetic, superparamagnetic or ferrimagnetic substances or low-temperature ferrites are present as colloids or in a powder form.

53. (new) The process for the production of thermosensitive polymers according to claim 26, and further comprising the steps of:

dispersively encapsulating said at least one magnetic or metallic colloids in a nano or microparticle core polymer; and

adding said encapsulation to the monomer solution.

54. (new) The process for the production of thermosensitive polymers according to Claim 53, wherein the core polymer comprises a compound selected from the group consisting of chitosan, dextran, starch, polyacrylic acid, polysaccharides, silica gel, silicone derivatives, cellulose, proteins, albumin, polyacrylic acid, agarose, alginate, polystyrene, polyacrylates, polymethacrylates, polycyanoacrylates, polymethyl methacrylate, polyvinyl alcohol, polyamino acids, hyaluronic acid, polylactides, polyglycolides, polyacrolein and copolymers of the same.

55. (new) The process for the production of thermosensitive polymers according to claim 26, wherein solvents are used as the organic phase and have a polar solubility parameter of  $5-10\ (\text{cal}/\text{cm}^3)^{1/2}$ .

56. (new) The process for the production of thermosensitive polymers according to claim 26, and further comprising the step of adding at least one surfactive substance to the organic phase at 0.05 to 15 % by weight.

57. (new) The process for the production of thermosensitive polymers according to Claim 56, wherein the surface active substance is at least one compound selected from the group consisting of alkyl sulphosuccinates, polyoxyethylene aryl ethers, polyoxyethylenes, polyoxyethylene sorbitan esters, polyoxyethylene adducts, polyethylene propylene oxide block copolymers, alkylphenoxy polyethoxy ethanolols, fatty alcohol polyethylene glycol ethers, polyglycerol esters, polyoxyethylene alcohols, polyoxyethylene sorbitan fatty acid esters, and polyoxyethylene acids.

58. (new) The process for the production of thermosensitive polymers according to claim 26, and further comprising the step of bonding a compound selected from the group consisting of affinity ligands, peptides, proteins, antibodies, antigens, enzymes, cell receptor antibodies, antibodies against tumor markers, antibodies against tumor antigens, antibody fragments, artificially produced antibodies, modified antibodies, antibody conjugates, oligosaccharides, glycoproteins, lectins, nucleic acid, streptavidin and biotin to the polymers.

59. (new) The process for the production of thermosensitive polymers according to claim 26, and further comprising the step of encapsulating the active agents in the polymers by adding the active agent(s) to a monomer solution containing at least one of magnetic or metallic colloids.

60. (new) The process for the production of thermosensitive polymers according to Claim 59, wherein the active agents are selected from the group consisting of hormones, cytostatic agents, antibodies, cytokines, immunomodulators, antigens, proteins, peptides, lectins, glycoproteins, nucleic acids, antisense-nucleic acids, oligosaccharides, antibiotics and generic agents.

61. (new) The process for the production of thermosensitive polymers according to claim 60, and further comprising the step of adding a compound selected from the group consisting of polyvalent alcohols, polyvinyl alcohols, gelatins and carbohydrates to the active agents in an amount of 0.1 to 20% by weight.

62. (new) The process for the production of thermosensitive polymers according to Claim 61, wherein the polyvalent alcohols or carbohydrates are selected from the group consisting of inosite, mannite, sorbite, aldonite, erythrite, sucrose, glycerine, xylite, fructose, glucose, galactose and maltose.

63. (new) A process for the release of active agents from active agent-containing particles, wherein the particles of thermosensitive polymers according to claim 1 or particles which have been produced according to a process of claim 26 comprising the

step of introducing said particles into a magnetic alternating field for magnetic induction.

64. (new) The process according to claim 63, wherein said magnetic alternating field is a high-frequency magnetic alternating field.

65. (new) The use of thermosensitive polymers containing at least one of magnetic or metallic colloids according to claim 1 or of particles produced by a process according to claim 26 as a contrast-intensifying media in NMR diagnostics, as carriers for active agents in medical therapy and diagnostics, as controllable carriers for reactants, as media to control microfluid processes, as separation media in column chromatography, as media to adjust and regulate pore sizes in membranes, as media to block blood vessels, as artificial cell carriers, as separation media for nucleic acids, cells, proteins, steroids, viruses or bacteria, in each case by using a magnetic alternating field, preferably a high-frequency magnetic alternating field.